

## **Compositions and Methods for Enhanced Synthesis of Nucleic Acid Molecules**

### **ABSTRACT**

The present invention is directed to compositions and methods for enhancing synthesis of nucleic acid molecules, particularly GC-rich nucleic acid molecules. Specifically, the invention provides compositions comprising one or more nitrogen-containing organic compounds having a formula selected from the group consisting of formula I and formula II (or salts or derivatives thereof), preferably 4-methylmorpholine N-oxide or betaine (carboxymethyltrimethylammonium), and further comprising one or more compounds selected from the group consisting of proline and an N-alkylimidazole compound, and more preferably proline, 1-methylimidazole or 4-methylimidazole. The invention further relates to methods for enhanced, high-fidelity synthesis of nucleic acid molecules, including via amplification (particularly PCR), reverse transcription, and sequencing methods. The invention also relates to nucleic acid molecules synthesized by these methods, to fragments or derivatives thereof, and to vectors and host cells comprising such nucleic acid molecules, fragments, or derivatives. The invention also relates to kits for synthesizing, amplifying, reverse transcribing or sequencing nucleic acid molecules comprising one or more of the compositions of the invention.